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Case Study: Acute Coronary Syndrome (ACS) Leading to Coronary Artery Bypass Grafting (CABG) in a 55-Year-Old Male with Complex Medical History

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Abstract

This study presents a comprehensive case study of Mr. XYZ, a 55-year-old male with a complex medical history. Mr. XYZ's admission was prompted by Acute Coronary Syndrome (ACS), leading to his subsequent Coronary Artery Bypass Grafting (CABG) procedure. Notably, he has been managing hypertension for two years and faced a prior challenge with Bell's Palsy. Furthermore, the case explores the causes and clinical manifestations of ACS and details the diagnostic evaluations conducted. The study outlines the patient's medical management, including medications, and surgical intervention, emphasizing CABG as a therapeutic measure for severe Coronary Artery Disease (CAD). In conclusion, this study highlights the need for holistic patient care and tailored health education to enhance the overall prognosis and quality of life for patients with complex medical backgrounds, like Mr. XYZ.

Key Words

;Acute coronary syndrome (ACS), Coronary artery bypass grafting (CABG), Hypertension, Bell's Palsy, Permanent pacemaker, Complex medical history, Holistic patient care, Tailored health education, Quality of life

Introduction to the Case Study:

The case of Acute Coronary Syndrome (ACS), commonly referred to as Coronary Artery Disease (CAD). This patient necessitates admission for Coronary Artery Bypass Grafting (CABG), reflecting a critical cardiovascular condition.[2] Moreover, the patient has been

managing hypertension for the past two years, further complicating the clinical picture. To add to the complexity, the patient experienced Bell's Palsy one year ago, a neurological condition that results in sudden facial muscle weakness or paralysis. Additionally, the patient relies on a permanent pacemaker for cardiac management.[6]

Coronary Artery Disease (CAD) is a prevalent cardiovascular condition characterized by the narrowing or blockage of coronary arteries, which supply blood to the heart muscle. This reduction in blood flow can lead to chest pain (angina), heart attacks, and other cardiac complications. CAD has been a persistent global health concern, with increasing incidence rates over the years.[2]

Bell's Palsy, on the other hand, is a neurological condition that results in sudden weakness or paralysis of the facial muscles on one side of the face. It is typically caused by the inflammation of the facial nerve and can lead to facial drooping, difficulty in closing one eye, and other facial asymmetry. [6] While it usually resolves on its own, it can have a significant impact on a person's quality of life during its course. The presence of a permanent pacemaker adds another layer of complexity to this case. It signifies an ongoing cardiac condition that requires meticulous monitoring and coordination with the surgical and medical team to ensure optimal cardiac function. Such a combination demands a comprehensive and multidisciplinary approach to patient care. Furthermore, the necessity for Coronary Artery Bypass Grafting (CABG) indicates a critical cardiovascular situation, adding complexity to the treatment plan and post-operative care.[2]

Diagnosis : Acute Coronary Syndrome (ACS): admitted for Coronary Artery Bypass Grafting (CABG), hypertension for the past two years, Bell's Palsy one year ago

I. Introduction:

Name: Mr. XYZ

- Age: 55 years old

- Gender: Male

- Marital status: Married

- Occupation: Businessman

- Religion: Hinduism

- Socioeconomic status: Upper-middle class

II. Personal Data:

- Address: [Nagpur]

Chief Complaints:

Chief Complaint: Severe chest pain and discomfort.

- Duration: Ongoing for several days.

- Radiation: Pain radiates to the left arm, jaw, and back.

- Associated Symptoms: Diaphoresis (excessive sweating), nausea, and vomiting.

Present Medical History:

- Current Diagnosis: Acute Coronary Syndrome (ACS).

- Hypertension (HTN) diagnosed two years ago.

- Bell's Palsy diagnosed one year ago.

- Diabetes Mellitus, well-controlled with medications.

- Pacemaker implantation ten years ago.

- Current Medications: Antihypertensive medications for HTN management and antidiabetic medications.

- No known allergies to medications.

Past Medical History:

- No known history of mental health issues.

- Strong family support system.

- Adaptive coping mechanisms, including prayer and meditation.

- Work-related stressors.

- Stable mood and affect.

Present Surgical History (Day of Surgery - 2nd Day):

- Date of Surgery: [22nd july 2023].

- Surgical Procedure: Coronary Artery Bypass Grafting (CABG).

- Rationale for Surgery: Severe Coronary Artery Disease (CAD) leading to ACS.

- Preoperative Preparation: Optimization of blood pressure and blood glucose levels.

- Chest incision and drainage tubes present.

- Monitoring of cardiac activity with leads and Holter monitoring.

- No signs of infection or wound complications noted.

III. Family History:

- Father: Alive

- Mother: Deceased

- Wife: Alive

- Children: One son and one daughter

- Brother(s): Two younger brothers

- Sister(s): One younger sister

IV. Medical History:

- Current illness: Myocardial infarction (heart attack) leading to CABG admission

- Past illnesses: Hypertension (HTN), Bell's Palsy (1 year ago)

- Allergies: None known

- Surgeries: Coronary Artery Bypass Grafting (CABG), Pacemaker implantation (10 years ago)

- Medications: On medications for hypertension and post-CABG management

V. Psychosocial Assessment:

- Mental health history: No history of mental health issues

- Social support system: Strong support from family members

- Coping mechanisms: Adaptive coping strategies such as prayer and meditation

- Stressors: Work-related stress, recent ACS diagnosis

- Mood: Stable

- Affect: Normal

VI. Nutritional Assessment:

- Diet: Mixed diet (vegetarian and non-vegetarian)
- Meal pattern: Three meals a day
- Snacking habits: Does not take any snacks in the evening
- Fluid intake: Average fluid intake
- Supplement use: None known

VII. Sleep Pattern Assessment:

- Sleep schedule: Goes to bed at 11 PM and wakes up at 7 AM
- Quality of sleep: Good quality of sleep
- Duration of sleep: 7 hours
- Disturbances during sleep: None known

VIII. Activities of Daily Living (ADLs) Assessment:

- Independence level: Independent in all ADLs
- Assistance needed: None

IX. Physical Assessment:

- Chief Complaint: Admitted for CABG due to ACS
- Head:
  - Hairs are black and sparse
  - No lesions or craniotabes
- Face:
  - Facial puffiness present
  - Vocal cord palsy

- Eyes:
  - Sclera clear
  - Conjunctiva pale
  - Pupils round and reactive to light and accommodation equally
  - Vision normal

- Nose:
  - No DNS (deviated nasal septum)
  - No discharge from the nose

- Mouth:
  - Endotracheal tube inserted
  - Lips dry

- Teeth:
  - Molars, medial incisors, and lateral incisors erupted
  - No dental caries

- Neck:
  - Central venous catheter inserted in the left jugular vein
  - CVP 14 cm
  - Inotropic drug[1] administered through CV line
  - No torticollis
  - No thyroid enlargement
  - No palpable lymph nodes

- Respiratory System:

  - Symmetrical expansion of the chest

  - Respiratory rate 20 breaths per minute

  - Chest drainage (mediastinal and pleural) present

  - Holter monitoring leads attached

  - Surgical vertical incision present and covered with a sterile sheet

  - Patient wearing chest leads

  - No scars

Cardiovascular System:

Inspection: -

There are no signs of redness, swelling, or discharge on surgical sit.

The pacemaker appears well-secured and intact.

Auscultation:

Heart Sounds:

Move on to auscultation. Using a stethoscope, I listened to the patient's heart sounds.

The first heart sound (S1) is [normal/abnormal], and the second heart sound (S2) is [normal/abnormal].

There are no additional heart sounds, murmurs, or rubs detected.

Palpation:

Pulse:

The radial, brachial, and carotid pulses are weak.

I also palpated the precordium for any thrills or abnormal pulsations, which are not present.

Surgical Site and Pacemaker:

Palpated the area around the pacemaker device to check for tenderness or discomfort. The patient reports no pain or tenderness.

The pacemaker is not movable, and there are no palpable abnormalities.

Gastrointestinal System:

- Temperature probe attached
- No visible peristalsis
- No visible veins
- No abdominal distention
- No spider angioma

Musculoskeletal System:

- Upper extremities:
  - Symmetrical
  - Radial pulse palpable
  - Range of motion normal
  - Edema absent

- Lower extremities:
  - Symmetrical
  - Femoral arterial line present on the right leg
  - Pedal pulse

Causes of ACS:[2]

1. Atherosclerosis: The most common cause of ACS is the buildup of fatty plaques (atherosclerosis) in the coronary arteries. Over time, these plaques can narrow or block blood flow to the heart muscle, leading to ischemia (lack of blood supply) and, in severe cases, a heart attack.

2. Hypertension (HTN): The patient's history of hypertension (high blood pressure) increases the risk of atherosclerosis and can contribute to the development of ACS.[5]

3. Diabetes Mellitus: Diabetes is another risk factor for cardiovascular disease. Uncontrolled diabetes can lead to damage to the blood vessels and an increased likelihood of atherosclerosis.

4. Age: Advancing age is a non-modifiable risk factor for ACS.[2]

5. Genetic Factors: Family history of heart disease and genetics can play a role in predisposing individuals to ACS.[2]

- The primary cause for the decision to perform Coronary Artery Bypass Grafting (CABG) in this patient is severe Coronary Artery Disease (CAD). This condition is characterized by the progressive buildup of atherosclerotic plaques within the coronary arteries, leading to reduced blood flow to the heart muscle.

- The patient's history of Hypertension (HTN), and a prior history of Pacemaker implantation may have contributed to the development and progression of CAD.

Clinical Manifestations (Signs/Symptoms):

- Chest Pain: Described as squeezing and pressure-like, often radiating to the left arm, jaw, and back.

- Diaphoresis: Excessive sweating.

- Nausea and Vomiting: Gastrointestinal symptoms.

- Bell's Palsy, a previous medical condition, led to facial puffiness and vocal cord palsy.

- After CABG, notable manifestations include:

- Relief of chest pain and discomfort.

- Improvement in cardiovascular symptoms.

- Surgical incision and chest drainage tubes.

- Monitoring for wound healing, cardiac activity, and potential complications.

Diagnostic Evaluation:

1. Electrocardiogram (ECG):

- Result: ST-segment elevation indicating myocardial infarction (MI) or changes consistent with ischemia.

2. Cardiac Biomarkers (Troponin, CK-MB):

- Result: Elevated troponin levels (e.g., Troponin I >0.04 ng/mL) indicating cardiac muscle damage.

3. Echocardiography:

- Result: Reduced left ventricular ejection fraction (LVEF) LVEF <40% indicating impaired heart function.

4. Coronary Angiography (Cardiac Catheterization):

- Result: Visual confirmation of coronary artery blockages, including:

  - Left Main Coronary Artery: 70% stenosis

  - Left Anterior Descending (LAD) Artery: 90% stenosis

  - Circumflex Artery: 80% stenosis

  - Right Coronary Artery (RCA): 60% stenosis

5. Chest X-ray:

- Result: signs of pulmonary congestion.

6. Blood Lipid Profile:

- Result: Elevated LDL cholesterol levels (LDL-C >130 mg/dL) indicating atherosclerosis risk.

9. Complete Blood Count (CBC):

- Result: reveal anemia (e.g., Hemoglobin 11 g/dL) , infection (Elevated WBC count).

10. Blood Chemistry Panel (Basic Metabolic Panel):

- Result: Assesses electrolyte imbalances, kidney function, and glucose levels, Serum Creatinine 1.0 mg/dL.

11. Arterial Blood Gas (ABG) Analysis:

- Result: Provides information on blood oxygen and carbon dioxide levels, pH 7.40, PaO2 90 mmHg, PaCO2 40 mmHg.

12. Holter Monitor or Event Monitor:

- Result: Continuous ECG monitoring for arrhythmias or ischemic events.

13. Transthoracic Esophageal Echocardiography (TEE):

- Result: Detailed imaging of cardiac structures, LVEF 35%.

17. Coronary Calcium Score:

- Result: Quantifies coronary artery calcification, Calcium Score 350 Agatston units.

20. Blood Pressure Monitoring:

- Result: To monitor and assess hypertension control, e.g., Blood Pressure 140/90 mmHg.

2D Echocardiography:

- Impression: Ischemic heart disease, Regional wall motion abnormality of LV at rest present, Impaired left ventricular systolic function EF-38%.

Angiography:[12]

- LAD (Left Anterior Descending) Artery:

- Type III vessel.

- Severe (90%) stenosis in the proximal segment present.

- Diagonal branch of thin caliber.

- LCx (Left Circumflex) Artery:

  - Severe (90%) stenosis at the proximal and distal segments present.

  - OM (Obtuse Marginal) branch has severe (80%) disease in the proximal segment.

- RCA (Right Coronary Artery):

  - Dominant vessel.

  - Severe (90%) stenosis at the ostium followed by total block in the proximal segment.

Catheterization Diagnosis:[12]

- Acute Inferior Wall Myocardial Infarction (MI).

- Severe Three-Vessel Disease (TVD).

Medical management:

Complete Blood Count (CBC)

Investigation	Patient value	Normal Range
Hemoglobin (Hb)	9.7g/dl	14 - 18 g/dL
Hematocrit (Hct)	27.9	37 - 47%
MCV	83.3 fL	76-96 fL
MCH	29.2 pg	27-32 pg
MCHC	35.0 g/dL	30-35 g/dL
RDW.CV	14.5 %	12-15 %
RBC count	3.34 x 10^6/µL	4 - 5 x 10^6/µL
WBC	9000/µL	4000 - 11000/µL
Neutrophils	90%	40-70%
Lymphocytes	7 %	20-40 %
Monocytes	2%	2-8%
Eosinophils	1 %	2 - 6%
Basophils	0%	0%-2 %
WBC Total	100	
Platelet count	471 x 10^3/µL	150 - 450 x 10^3/µL

Medical Management Plan:

1. Antiplatelet Therapy:

  - Aspirin (ASA): 325 mg orally (chewed or swallowed) once daily.

- Clopidogrel (Plavix): 75 mg orally once daily.

2. Statin Therapy (Lipid-Lowering Medication):[1]

- Atorvastatin (Lipitor): 40 mg orally once daily.

3. Blood Pressure Management (for Hypertension):[1]

- Amlodipine (Norvasc): 5 mg orally once daily.

- Metoprolol (Toprol XL): 50 mg orally once daily.

4. Pain Management:[1]

- Acetaminophen (Tylenol): 500 mg orally every 4-6 hours as needed for pain.

5. Glycemic Control (for Diabetes):[1]

- Metformin (Glucophage): Continue current dose.

- Insulin (as needed): Adjust insulin regimen to maintain target blood glucose levels.

6. Gastroprotection (to prevent GI bleeding):

- Pantoprazole (Protonix): 40 mg orally once daily1.

7. Antiarrhythmic (as needed):[1]

- Amiodarone (Cordarone):

8. Anticoagulation (as appropriate):[1]

- Enoxaparin (Lovenox): Subcutaneous injection as directed for deep vein thrombosis (DVT) prophylaxis.

Surgical Management:

Surgical Technique:

The patient underwent CABG using bilateral internal thoracic arteries as conduits.[4]

All diseased segments of the coronary arteries were bypassed to ensure complete revascularization.

The procedure was performed off-pump to minimize the risk of neurological complications.

Health education for a patient post-CABG

1. Recovery After CABG:[4]

- Explain that post-CABG recovery is a gradual process and may take several weeks to months.

- Emphasize the importance of following medical advice and restrictions provided by healthcare professionals.

2. Medications:

- all medications, including those for ACS, hypertension, and any others.

- Explain the purpose of each medication and the importance of taking them as directed.

- Discuss potential side effects and what to do if they occur.

3. Lifestyle Modifications:

- Reinforce the need for heart-healthy lifestyle changes:

- Diet: Encourage a low-sodium, low-fat, and high-fiber diet. Discuss portion control and avoiding processed foods.

- Exercise: Recommend a gradual increase in physical activity as advised by healthcare providers.

- Smoking Cessation: If the patient smokes, provide resources and support to quit.

- Stress Management: Discuss stress reduction techniques, such as relaxation exercises or counseling.

4. Blood Pressure Management:

- Stress the importance of managing hypertension effectively to reduce the risk of future heart issues.[5]

- Encourage regular monitoring of blood pressure at home.

- Discuss the role of antihypertensive medications and adherence to treatment plans.

5. Bell's Palsy and Recovery:

- Review the patient's history of Bell's Palsy and ensure they are aware of any residual effects or complications.

- Provide reassurance that Bell's Palsy does not directly impact heart health or the recovery from CABG.

6. Postoperative Care:

- Explain the importance of maintaining good wound care, including keeping the incision clean and dry.

- Review any restrictions on physical activities and when it is safe to resume normal daily activities.

7. Cardiac Rehabilitation:

- Discuss the potential benefits of participating in a cardiac rehabilitation program.

- Explain that these programs are designed to help patients regain strength, improve cardiovascular health, and reduce the risk of future cardiac events.

8. Follow-Up Appointments:

- Emphasize the necessity of attending all follow-up appointments with cardiologists and primary care physicians.

- Discuss the importance of ongoing monitoring of heart health and the adjustment of treatment plans as needed.

9. Emergency Response:

- Remind the patient about the signs and symptoms of a heart attack or stroke and the immediate actions to take, such as calling 911.

10. Emotional Support:

- Encourage the patient to seek emotional support from friends, family, or support groups if they are experiencing anxiety or depression related to their health.

11. Medication Reconciliation:

- Remind the patient to keep an up-to-date list of all medications, including over-the-counter drugs and supplements, and share this list with healthcare providers.

Prognosis:

The prognosis for Mr. XYZ following CABG is favorable, given the successful revascularization of coronary arteries and ongoing management of his cardiac condition. However, his medical history, including hypertension, diabetes, and previous pacemaker implantation, necessitates long-term monitoring and adherence to medication and lifestyle recommendations. With proper care and adherence to medical advice, Mr. XYZ can expect an improved quality of life and a reduced risk of future cardiac events.

Conclusion:

Mr. XYZ's case underscores the significance of comprehensive cardiovascular care in patients with complex medical histories. The successful management of his ACS and subsequent CABG procedure involved a multidisciplinary approach, addressing not only his cardiac condition but also comorbidities such as hypertension and the previous episode of Bell's Palsy. Health education and post-CABG guidance are essential components of his care, emphasizing medication adherence, lifestyle modifications, and emotional support. By providing holistic care and tailored education, healthcare professionals can contribute to improved patient outcomes and overall well-being.

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